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Indian Standard

SPECIFICATION FOR GARDEN RAKE

(First Revision)

UDC 631·315·6

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Rs 5·00 Gr 2

December 1978

Indian Standard
SPECIFICATION FOR GARDEN RAKE
(First Revision)

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Indian Standard
SPECIFICATION FOR GARDEN RAKE
(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 29 September 1978, after the draft finalized by the Horticultural Equipment Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Garden rake is used for collecting uprooted weeds, breaking clods and to some extent levelling of seed-beds in the gardens.

0.3 This standard was first published in 1963. A need was felt to revise this standard to incorporate latest technological developments and to include strength tests.

0.4 The figures included in the standard are only given as typical illustration of the components and should not be considered as suggestive of any standard design.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard specifies material, sizes and other requirements for garden rake.

2. TYPES

2.1 The garden rakes shall be of following two types:

a) Forged-spike type (*see* Fig. 1), and
b) One-piece type (*see* Fig. 2).

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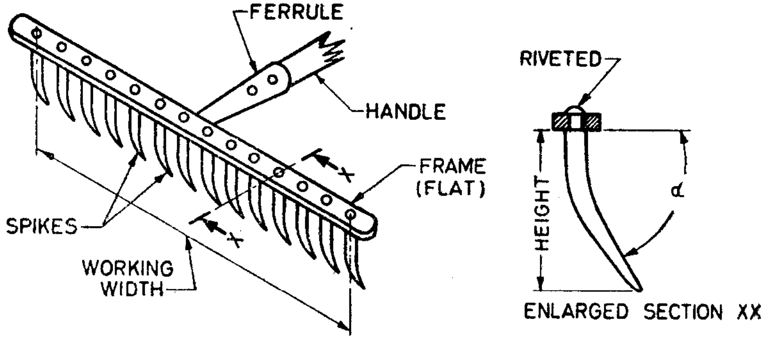
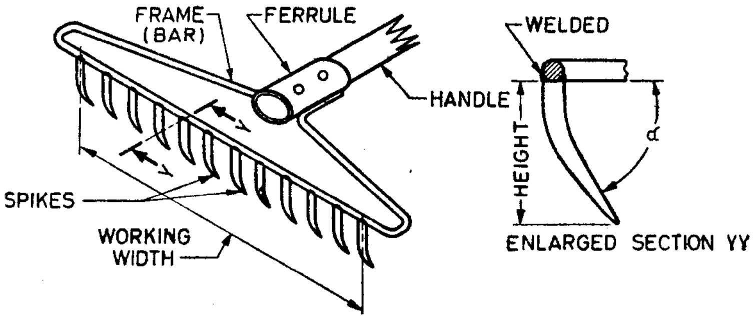
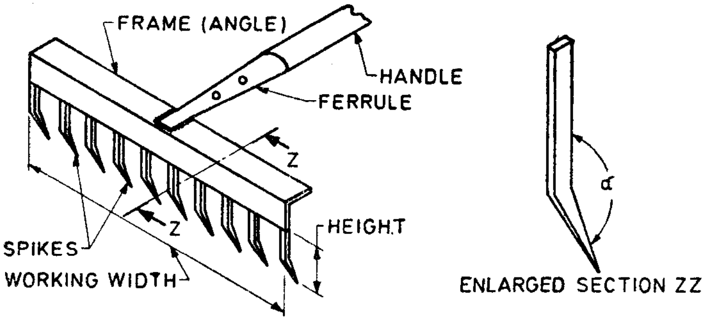
*Rules for rounding off numerical values (*revised*).



RIVETED SPIKES



SPIKES WELDED TO BAR



SPIKES WELDED TO ANGLE

Fig. 1 Forged-Spike Type Garden Rake

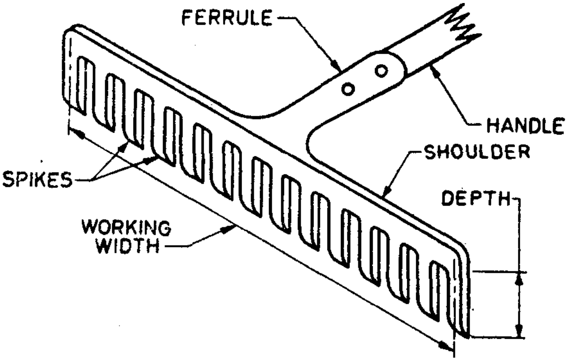


FIG. 2 ONE-PIECE TYPE GARDEN RAKE

3. MATERIAL

3.1 Frame — Mild steel (*see* IS : 226-1975*) shall be used.

3.2 Spikes — The steel used shall enable the rakes to meet the requirement specified in **8**.

3.3 Ferrule — Mild steel sheet (*see* IS : 1079-1973†), tube (*see* IS: 3601-1968‡) or brass (*see* IS : 410-1967§) shall be used.

3.4 Handle — Timber (*see* Appendix D of IS : 620-1975||) or bamboo shall be used.

4. HARDNESS

4.1 The spikes shall be of unhardened or hardened condition as specified by the purchaser. In case of hardened condition, these shall have a hardness not less than 25 HRC when measured at a distance between 15 to 35 mm from free end of the spikes.

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*Specification for structural steel (standard quality) (*fifth revision*).

†Specification for hot rolled carbon steel sheet and strip (*third revision*).

‡Specification for steel tubes for mechanical and general engineering purposes.

§Specification for rolled brass plate, sheet, strip and foil (*second revision*).

||Specification for general requirements for wooden tool handles (*third revision*).

5. SIZES

5.1 The size of the rake shall be expressed by its working width in mm, which is the distance from the centre of extreme spike at one end to the centre of extreme spike at other end. The size and number of spikes shall be as given below:

No. of spikes	8	10	12	14	16
Size, mm ±5	210	270	330	390	450

6. OTHER REQUIREMENTS

6.1 In case of the forged-spike type rakes, the spikes shall be welded or riveted to the frame and in case of one-piece type rakes, the spikes shall be formed by pressing or forging the sheets.

6.2 The centre to centre distance of the spikes shall be uniform. The variation shall not exceed ±1 mm.

6.3 The spikes shall be slightly curved at their lower ends. In case of forged-spike type rakes the spikes shall be so curved that the angle formed with the frame be in the range of 45 to 60° (*see* α in Fig. 1).

6.4 The ferrule shall be rigidly attached with the frame in case of the forged-spike type rake and with the shoulder in case of the one-piece type. In case of the one-piece type, the shoulder may be extended to form the ferrule. The minimum thickness of the ferrule shall be 1·5 mm. The ferrule may be cylindrical or conical. The diameter of rivet used for fixing the ferrule and handle shall be 3 to 6 mm.

6.5 The height or depth of the spikes (*see* Fig. 1 and 2) shall be in the range of 50 to 80 mm. However in a rake only one selected height or depth shall be used. The variation in declared height or depth shall be not more than ±2 mm.

6.6 The handle shall be rigidly attached to the ferrule with the help of minimum two rivets. The length and diameter of the handle shall be in the range of 1·5 to 1·75 m and 25 to 35 mm respectively. The wooden handle shall comply with the requirements specified for class 4 handles of IS : 620-1975*.

7. WORKMANSHIP AND FINISH

7.1 The welding and riveting of the various parts of the garden rake shall be satisfactory. The welds shall not be porous. The welded joints shall be well dressed and smoothly finished.

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*Specification for general requirements for wooden tool handles (*third revision*).

7.2 The components shall be free from cracks, splits, burrs and other defects.

7.3 The handle shall be finished smooth.

7.3.1 The bamboo, if used, shall be free from beetle attack, any kind of decay, splits, cuts or objectionable cracks. The cavity of the bamboo shall not exceed one-third of the diameter at the thin end of the bamboo. The nedal portion of the bamboo shall be finished smoothly.

7.3.2 The wood, if used, shall be well-seasoned and shall be free from centre heart (pitch), any kind of decay (rot), cracks, shakes, splits (except hair splits), borer holes, warp and any other defects excepting those permitted in the finished handle (*see* **8** of IS : 620-1975*) which are likely to reduce the life or strength or affect the utility of handles.

7.4 The metallic parts of the rake shall be painted with the suitable rust preventive paint. The wooden handle may be given a coat of varnish.

8. STRENGTH TESTS

8.1 Drop Impact Test — Extreme end of the handle shall be attached to a wood base and loosely pivoted at surface level with a flat horizontal steel plate. The head should be elevated to a height of one metre and dropped with spikes point falling on the steel plate. This should be repeated for four times. The spikes and other portions shall not flatten, chip, crack, fracture or deform as a result of this test.

8.2 Pull Test — The frame or shoulder shall be secured in a stationary fixture and the ferrule of the rake shall be kept vertical. A 35 kg mass shall be attached to the centre of any one spike and suspended for 2 minutes. As a result of this test, the spike tested shall not show deformation or permanent set after the removal of the mass.

9. MARKING

9.1 Each rake shall be marked with the following particulars:

a) Manufacturer's name and registered trade-mark, if any;

b) Size;

c) *H*, if hardened; and

d) Batch or code number.

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*Specification for general requirements for wooden tool handles (*third revision*).

9.1.1 Each rake may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

10. SAMPLING FOR LOT ACCEPTANCE

10.1 Unless otherwise agreed to between the purchaser and the supplier, the sampling and criteria for conformity of rakes shall be done in accordance with **3** of IS : 7201-1974*.

10.1.1 The classification of different requirements of this standard for the purpose of testing for lot acceptance is given below for guidance:

a) *Dimensional and visual requirements* — *See* **5**, **6**, **7** and **9.1**.

b) *Other than dimensional and visual requirements* — *See* **4** and **8**.

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*Method of sampling of agricultural machinery and tractors.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	CONVERSION
Force	newton	N	1 N = 0·101 972 kgf
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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Printed at Printograph, New Delhi, India